A taxonomy of intrusive mental images in clinical disorders: What can "non-veridical" images tell us about the nature of human memory?

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Abstract

Intrusive mental images associated with autobiographical memories or depicting imagined scenes are common in psychological disorders. Although there is a growing body of literature on their contribution to psychopathology and their role in therapy, to date there have been limited attempts to categorise the different types of images that patients experience. In this article, we present a taxonomy which ranges from veridical to non-veridical intrusive images. We highlight the fact that many types of images consist of a blend of veridical and imagined details. After presenting some of the main explanations for the existence of blended and non-veridical images, we reflect on what the evidence on the content and origin of intrusive images tells us about the nature of human memory. We argue that it supports the idea of memory being constructive and briefly discuss what this means for clinical and non-clinical settings in which intrusive images have to be evaluated and used.

Keywords: intrusive mental imagery; trauma; psychological disorders; constructive memory

Introduction

Mental images are cognitive representations which arise in the absence of external sensory input but contain elements from one or more sensory modalities (Kosslyn et al., 2001). Like memories, they may be activated voluntarily or involuntarily. Although involuntary memories and images are common elements of our conscious experience (Krans et al., 2015; Rasmussen & Berntsen, 2011), they can contribute to psychological disorders if they become recurrent and uncontrollable (for reviews, see Brewin et al., 2010; Çili & Stopa, 2015, 2019; Ji et al., 2019). Maladaptive intrusive images are often vivid and associated with negative core beliefs. They can trigger behavioural and cognitive responses (e.g., rumination, avoidance, safety behaviours) that perpetuate distress.

Intrusive images often originate from autobiographical memories, but can also be entirely imaginary (see Çili & Stopa, 2015, 2019). They are conceptualised on a continuum starting with the relatively accurate reconstruction of an actual experience and ending with the representation of a hypothetical situation (Martin & Williams, 1990) or hallucinatory experiences (see Klein & Moritz, 2014). To date, there have been limited attempts to categorise images. For example, Grunert et al. (1988) distinguish between *"replaying" flashbacks* (actual trauma), *appraisal flashbacks* (images depicting post-trauma appraisal), and *projected flashbacks* (images of hypothetical worst outcomes). Stopa and Bryant (2004) talk about individuals constructing *non-veridical* images. Discussing posttraumatic stress disorder (PTSD), Grey (2009) distinguishes between veridical images reflecting experience and non-veridical images including *composite images* constructed from multiple events, *worst-case scenarios*, *depersonalisation* (seeing the self from "outside"), and *reconstructed images* (e.g., images based on acquired information in the absence of direct experience). Brewin et al. (2010) refer to *memory-based* and *fantasy-based* images, acknowledging that the latter may contain memory-related details. Krans et al. (2015) distinguish between

involuntary *memories* and *non-memories* (daydreams, ruminations, worst-case scenarios, imagined future events, and hypothetical reconstructions or filling gaps in one's knowledge about an event) in everyday life. Other researchers (Oulton et al., 2018; Reynolds & Brewin, 1998) have conceptualised non-memories as encompassing *elaborative cognitions* which are plausible but do not reflect experience and *evaluative cognitions* which are about blame, responsibility, or the impact of an experience.

Despite the distinctions above, to date no one has proposed a comprehensive taxonomy of intrusive images. Doing so would advance our understanding of the differences between images and their role in psychopathology, as well as the memory processes from which they develop. This article is our attempt to construct such a taxonomy drawing on existing literature and then reflecting on what it can tell us about the nature of human memory.

A taxonomy of intrusive images in clinical disorders

We propose that intrusive images can be divided into the 11 categories described below. We acknowledge that there are potential overlaps between categories and therefore they have fuzzy boundaries. For example, several types of images can be blended. We also acknowledge that sometimes in the literature it is difficult to determine the extent to which images are veridical. Research participants are not always asked whether their intrusions are linked to particular memories and, if so, how. At other times, it is difficult to ascertain whether the intrusions are related to real events or not because individuals have poor or no recollection of these events (see Bryant, 1996; Wade et al., 2015). With these caveats in mind, we describe each category of intrusive images in the following sections.

1. Veridical images

These images correspond to an autobiographical memory, that is a memory for a personally experienced event which happened at a specific time and place. The memory itself, segments of it ("film clips"), and snapshots or single images (e.g., visual images, sounds, smells, physical sensations such as pain) may become intrusive (e.g., Coughtrey et al., 2015; Macdonald et al., 2018; Mihailova & Jobson, 2018; Muse et al., 2010). For example, patients with PTSD may have intrusions related to hotspots, which are moments of peak emotional distress during a traumatic experience (Holmes et al., 2005), or fragments of the trauma which signalled a shift for the worse in its meaning (Ehlers et al., 2002).

2. Composite images

Composite images arise from a combination of events which may share meanings, emotions, or sensory elements (Grey, 2009; Hackmann, 2011). They are often related to repeated adverse experiences, such as repeated sexual abuse or multiple combat situations. They can also incorporate the experience of illness itself, such as Morrison et al.'s (2002) case of a patient with psychosis who saw himself rocking in a psychiatric hospital. This image accompanied his psychotic symptoms and was associated with past experiences of hospitalisation.

3. Images associated with memories

These images are associated with memories with which they may share themes or thoughts, emotional tone, or sensory qualities. However, their content does not correspond directly to what happened in the remembered events. In some cases, the images reflect the "abstracted essence of the memory" (Hackmann et al., 2000, p. 605). A good example is a patient with health anxiety who experienced an image of himself falling down a spiral well leading to hell (Wells & Hackmann, 1993). This image was associated with childhood

memories of a preacher threatening followers with eternal suffering in hell, as well as his family asking whether he had been "saved" when he got ill and saying that he would know if that was the case. Because he did not know whether he had been saved or not, he believed he was destined for hell.

4. Blended images

Images in this category contain a blend of veridical and non-veridical elements. For example, Morrison (2004) reports the case of a patient with delusional disorder who experienced recurrent images of himself being thrown into the back of a van and assaulted by several people with various weapons. He had experienced physical abuse while growing up in residential care and physical assault while in prison. His images resembled an event he had seen on television, as well as an assault in prison. Elements from his personal experience had thus become blended with elements from the television event.

5. Reconstructed images

Drawing on Grey (2009), we propose that reconstructed images reflect event details that individuals have drawn from sources such as third-party accounts of what happened to them, for example because they were unconscious during a trauma. These images can be blended when individuals have simply filled the gaps in their memory or depict purely imagined details. Bryant (1996) argues that, in these cases, the trauma representations and intrusions are generated after the trauma, although they may contain real details that the person encoded during the trauma but does not consciously remember. He describes a patient with PTSD who was amnesic for the accident in which he sustained brain injuries, but had seen the police reports and a newspaper photograph of his destroyed car. He first experienced intrusions of himself bleeding inside his car which were similar to the newspaper photograph.

As he increasingly worried about his children's safety if he started driving again, he started experiencing images of his children lying dead in the car.

6. Vicarious images

Vicarious images relate to events that have occurred to other people and usually result from imagining others' experiences while hearing or reading about them. Intrusive images can result from simply listening to and imagining traumatic material (Krans et al., 2010). A good example are the many offspring of World War II survivors in Dashorst et al.'s (2020) study who experienced vivid intrusions related to the war and their parents' war experiences although they themselves were born after the end of the war. Vicarious intrusive images are also common among professionals working with traumatised individuals, such as therapists or counsellors (Dunkley & Whelan, 2006; Pearlman & Mac Ian, 1995; Way et al., 2004), lawyers (Vrklevski & Franklin, 2008), and researchers (Smith et al., 2019).

7. Worst-case scenarios about past events

These images are based on a past adverse event and represent an exaggerated, often feared, version of it (Grunert et al., 1988; Merckelbach et al., 1998). Usually they are blended images combining real and imagined details. Grunert and colleagues (1988), for example, found that some individuals experienced flashbacks of work-related hand injuries which were worse than the injuries sustained. Such worst-case scenarios may develop during the event as individuals fear and perhaps form a catastrophic image of what might happen next or develop as a result of post-event appraisals (Grey, 2009; Hackmann, 2011).

8. Flashforwards

These images feature anticipated future events and may be entirely non-veridical or contain memory-related details (e.g., Hales et al., 2011; Holmes et al., 2007; Muse et al., 2010; Price et al., 2012). Although they have been largely conceptualised as depicting negative events linked to low mood or positive events linked to mania/hypomania, they can also depict future-oriented worst-case scenarios or anxiety-related "what if" thinking. Negative flashforwards may feature non-suicidal injury (Cloos et al., 2020), death, or suicide (Gregory et al., 2010; Hales et al., 2011; Holmes et al., 2007). Anticipated worst-case scenarios may represent a feared event, such as being diagnosed with a life-threatening illness in health anxiety (Muse et al., 2010) or blushing intensely in social anxiety (see Clark & Wells, 1995). Finally, positive flashforwards can depict desired achievements and are often experienced by patients with bipolar disorder during episodes of positive mood or during manic and hypomanic phases (Gregory et al., 2010; Ivins et al., 2014).

9. Depersonalisation and derealisation images

These images usually result from dissociative experiences, which involve a disruption of and/or lack of continuity in the normal integration of psychological functions such as consciousness, perception, self, body representations, and behaviour (American Psychiatric Association, 2013). Depersonalisation involves feeling detached from one's self, mental processes, body, or actions. Derealisation, on the other hand, involves experiencing detachment from one's surroundings (American Psychiatric Association, 2013). Depersonalisation images typically involve out-of-body experiences (Grey, 2009; Hackmann, 2011). They may be common among individuals with such experiences, for example those who have near-death experiences in life-threatening situations (Greyson, 2001). Both depersonalisation and derealisation images may contain non-veridical elements, as well as real details of what happened during the dissociative experience (Stopa, 2013).

10. Hallucinations

Hallucinations are vivid, involuntary perception-like experiences of different modalities which occur in the absence of external stimuli (American Psychiatric Association, 2013). Although hallucinations and mental imagery are often considered as independent phenomena, they are conceptualised in a similar manner (see Morrison et al., 2003; Smith, 2018). Hallucinations may reflect purely imagined details, such as supernatural beings (Gearing et al., 2011). However, they can also be associated with and reflect trauma (Geddes et al., 2016; Hardy, 2017; Hardy et al., 2016; Morrison et al., 2003; Paulik et al., 2019; Pilton et al., 2015). Paulik and colleagues (2019), for example, describe a patient with schizoaffective disorder who heard voices which told her abusive things that her father used to say to her. Occasionally, individuals experience hallucinations and delusions under particular circumstances (e.g., while in an intensive care unit) and memories of these become intrusive (Wade et al., 2015).

11. Non-veridical images

These images consist entirely of imagined events or scenes and details. They are not associated with specific autobiographical memories through shared qualities such as themes. Examples include the images accompanying chronic pain in some patients. Berna and colleagues (2011), for example, report the case of a female patient with chronic pelvic pain who experienced an image of malicious demons playing around her pelvis.

What can "non-veridical" images tell us about the nature of human memory?

The taxonomy proposed here suggests that intrusive images do not necessarily reflect "historical truth" (Bryant, 1996, p. 626). Whereas some are entirely non-veridical, many

images which are characterised as non-veridical in the literature actually contain a blend of real and imagined or distorted details. There are various reasons why this might happen. In the case of trauma, for example, the dual representation theory (Brewin et al., 1996; Brewin et al., 2010) proposes that individuals may focus on sensory impressions rather than on the event's meaning or context. This leads to the formation of strong sensory representations (e.g., visual images) which are poorly connected with or disconnected from the contextual representations of the event. These sensory representations may then become intrusive. Although this suggests that trauma memories may be fragmented and the evidence on this issue is inconclusive (see Brewin, 2016; Crespo & Fernández-Lansac, 2016; Rubin et al., 2016), it is reasonable to argue that memory gaps resulting from a peritraumatic focus on sensory information or dissociation may create the need to fill these gaps. Filling in gaps, for example with information acquired from different sources (e.g., media, relatives), may thus result in memories and intrusive images containing both factual and non-factual details.

Autobiographical reasoning is the process of reflecting about our experiences and linking them to each other and to the self in order to give meaning to these experiences and construct a coherent life narrative (Habermas & Bluck, 2000). This meaning making process offers a second reason why intrusions may not accurately reflect reality. It may distort recollection or emphasise some details at the expense of others. For example, it may indirectly contribute to the formation of blended or non-veridical images if it produces meanings which have negative implications for the self. Mental images may be highly relevant to the self (see Çili & Stopa, 2015) and represent information about goals (Conway, Meares, et al., 2004). When these images and the associated memories require extreme goal or self change and thus threaten the coherence of the self-memory system, this system may defend itself through memory or imagery distortion (Conway, Meares, et al., 2004; Conway, Singer, et al., 2004). For example, assault victims may interpret the assault as indicating the

dangers of a world where random things happen and they are vulnerable. This may be too threatening. They may thus distort the assault memory and intrusions to suggest that the assault could have been prevented. Blaming themselves may help them preserve their idea of being in control of their life. If the interpretation of the event changes over time, the content of the intrusions may also change.

A third explanation for the fact that intrusive images are not always veridical is related to reality and source monitoring. Reality monitoring involves the psychological processes through which individuals distinguish between real and imagined events (Johnson & Raye, 1981), whereas source monitoring involves monitoring the source of or conditions under which information is acquired (Johnson et al., 1993). Holmes and Mathews (2010) and Strange and Takarangi (2015) propose that reality and source monitoring may be difficult when individuals repeatedly remember or imagine events (e.g., past traumas, suicide plans). Repeated memory retrieval and intrusive image activation can introduce new, inaccurate, details which become incorporated into individuals' memory over time. Although in some cases individuals are aware that their memories and associated intrusions are not real, in other cases the new details may be mistaken for what really occurred. The fact that intrusive images are vivid and associated with intense affect may contribute to the perception that they are familiar and real, thus producing a failure in reality and source monitoring.

Taken together, the theories we just presented, the fact that many intrusive images are blended or non-veridical, and the potential of imagery distortions to change depending on individuals' interpretations have important implications for our understanding of the nature of memory. We believe that they support the idea that memory is constructive, that the retrieval of past- or future-oriented memories and images involves the activation and combination of their various elements, and that errors do occur in this process (Bartlett, 1932; Schacter & Addis, 2007; Schacter et al., 1998). This has practical implications which may depend on the

setting intrusive images are evaluated and used in. In clinical settings, it may be important to determine what happened to a patient since factual information may help correct memory/imagery distortions and associated erroneous beliefs. However, the presence of distortions does not necessarily affect treatment. In interventions such as the highly effective imagery rescripting (see Arntz & Weertman, 1999; Morina et al., 2017), the focus is on modifying the meanings attributed to the intrusions rather than correcting their content. In contexts such as legal settings, however, greater caution is needed. These images cannot be accepted at face value since many of them are likely to contain non-veridical elements which some individuals may believe to be true. However, we believe it is inappropriate and potentially dangerous to assume that intrusive images are entirely inaccurate and should therefore be dismissed. After all, even flashforwards and hallucinations may contain veridical elements from past experiences. When the objective truth of what happened to an individual needs to be established, therefore, every case should be evaluated on its own merits. As the evidence suggests, the answer to whether intrusive images reflect reality or not often lies somewhere in the middle.

Conclusions

- Intrusive mental images which contribute to the onset and maintenance of clinical disorders may contain veridical elements, non-veridical elements, or a combination of both.
- Many of the intrusive images that are characterised in the existing literature as non-veridical actually contain both veridical and non-veridical elements.
- The incorporation of non-veridical elements in intrusive images and the potential for imagery content to change over time points to the constructive nature of memory.

Disclosure statement

The authors declare no conflict of interest.

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